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ABSTRACT

The linguistic role of the right hemisphere in bilingual language processing was examined. Ten right-handed Spanish-English bilinguals were tachistoscopically presented with mixed lists of Spanish and English words to either the right or left visual field and asked to identify the language and the word presented. Five of the subjects identified English as their first language and five, Spanish. Their median age was 22. Language recognition scores, corrected for guessing, were superior to word recognition only for right hemisphere trials. While word recognition did not depend on visual field of presentation or language of presentation, language recognition varied both with visual field and with language. Spanish words were better recognized than English words in right hemisphere presentations for the language recognition task; for the word recognition task, English words were identified more successfully than Spanish words for left hemisphere presentations. It is concluded that the right hemisphere superiority is based on a specific left hemisphere deficit in recognizing the second language and a general right hemisphere superiority for recognition of Spanish. (Author/RW)

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Hemispheric Differences in Bilingual Word and Language Recognition

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Abstract

Ten Spanish-English bilinguals were tachistoscipically presented mixed lists of Spanish and English words to either the right or left visual field and asked to identify the language and the word presented. Language recognition scores, corrected for guessing, were superior to word recognition only for right hemisphere trials. While word recognition did not depend on visual field of presentation--consistent with previous research--or language of presentation, language recognition varied both with visual field and with language. Differences between right and left hemisphere function in bilingual language performance are indicated.

Hemispheric Differences in Bilingual Word and Language Recognition

Research on word recognition has indicated that the brain organization of language is more ambilateral in bilinguals than in monolinguals. (Albert & Obler, 1978; Kinsbourne, 1981). The current study extended this work to the process of language recognition. Our primary hypotheses were that language recognition would be superior to word recognition, indicating a hierarchy of language processing rules, and that this effect would be most strongly marked for right hemisphere presentations, indicating a linguistic role for the right hemisphere in bilingual language processing.

Method

Subjects

Ten right-handed Spanish-English bilinguals volunteered to participate in this study. Five of the participants identified Spanish as their first language and five identified English. All of the participants had spent a minimum of one year in their second language environment. Six of the participants were men and four were women. Their median age was 22.

Procedure

A list of 64 high frequency Spanish and English words was constructed which attempted to match frequency of usage, length, and presence of orthographically unique features (e.g., ñ and w) across the two languages. The words were presented on a Scientific Prototype Model 800-F two channel tachistoscope, with half of the presentations being central and half peripheral visual field presentations. Participants were instructed

to identify both the word and the language of the word. Guessing was encouraged. Speed of presentations was varied individually to produce a constant error rate on language recognition of 20% on central trials; 80 to 100 msec represent typical values.

Results

Data for central and peripheral presentations were analyzed separately. For central presentations, there were no differences in (corrected) language and word recognition rates nor were there any significant effects for language of the words or first language of the participants.

For the peripheral presentations, a four factor analysis of variance was performed using native language as a between subjects factor and processing task (language and word recognition), visual field, and language of presentation as within subject factors. A standard correction for guessing was applied to the language recognition data. Cell means for each of the conditions are presented in Table 1. A marginally significant main effect due to task was found ($F=4.98$, $df=1,8$, $p < .06$), in the direction of superiority for language recognition. More importantly, significant interactions were found between task and visual field ($F=23.11$, $df=1,8$, $p < .01$), indicating that language recognition superiority is specific to the right hemisphere presentations. This finding, however, is itself qualified by significant higher-order interactions: specifically, significant interactions among task, visual field, and language of presentation ($F=11.93$, $df=1,8$, $p < .001$) and task, visual field, language of presentation, and subject's native language ($F=6.20$, $df=1,8$, $p < .05$). The first of these interactions indicates

that Spanish words were better recognized than English words in right hemisphere presentations for the language recognition task; for the word recognition task, English words were identified more successfully than Spanish words for left hemisphere presentations. In other words, language specific effects were found for each task operating in opposite directions. The second interaction implies native language effects: for language recognition, the native language is better recognized in the left hemisphere than is the non-native language; there were no differences for right-hemisphere presentations.

Conclusion

While the word recognition data are consistent with previous research in suggesting a relatively ambilateral representation of language in bilinguals, the language identification data give a more complex picture of the processing underlying bilingualism. A strong right hemisphere superiority for language recognition was found. This right hemisphere superiority, however, rests on two higher-order interactions: a specific left-hemisphere deficit in recognizing the second language and a general right hemisphere superiority for recognition of Spanish. The left-hemisphere deficit is consistent with theories of compound bilingualism which assert that second language acquisition involves a spill-over into the right hemisphere (see Kinsbourne, 1981, for review). The language specific effect requires more speculative interpretation. The most plausible interpretation of the right-hemisphere superiority in recognizing Spanish is that the left hemisphere is biased toward word recognition within the environmental language--in this instance,

English. This effect would be independent of the native language of the subject. This is consistent with the current data. The right hemisphere would then primarily serve a switching function and would therefore be biased toward identification of the non-contextual language.

References

Albert, M.L. & Obler, L.K. The bilingual brain: Neuropsychological and neurolinguistic aspects of bilingualism. New York: Academic Press, 1978.

Kinsbourne, M. Neuropsychological aspects of bilingualism. In H. Wintz (Ed.), Native language and foreign language acquisitions. Annals of the New York Academy of Science, Vol. 379, 1981.

Table 1

Mean Recognition Scores for Language and for Words

Task	Hemisphere	Language	Subject Native Language	
			English	Spanish
Language[a]	Right	English	2.4	2.0
		Spanish	6.0	5.2
	Left	English	4.0	1.2
		Spanish	-.8	3.2
Word	Right	English	1.8	1.6
		Spanish	2.0	1.4
	Left	English	2.4	1.8
		Spanish	1.6	1.6

Note: n=10

[a]Language recognition scores corrected for guessing